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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]The invention of this application relates to a charge monitor method and a charging and discharging device. The invention of this application relates to the new charge monitor method which can grasp and supervise the charge of a storage battery simply and correctly, and the new charging and discharging device which can carry out the automatic control of the charge and discharge of a storage battery simply and correctly in more detail.

[0002]

[Description of the Prior Art]Conventionally, as a method of supervising the charge of a storage battery, the terminal voltage of a storage battery is measured and what grasps and supervises a charge using the amplitude-measurement value is known.

[0003]For example, drawing 5 illustrates the circuitry which realizes this conventional charge monitor method. While measuring the terminal voltage of a storage battery (1) in this circuitry with the voltmeter V by which multiple connection was carried out to the storage battery (1) and supervising a charge using that amplitude-measurement value, The automatic control of the charge and discharge of a storage battery (1) is carried out by controlling opening and closing of the switches SW1 and SW2 according to an amplitude-measurement value. Thereby, overcharge and overdischarge are prevented. Therefore, the circuitry of such drawing 5 also serves as the conventional charging and discharging device which carries out the automatic control of the charge and discharge of a storage battery (1) according to the terminal voltage of a storage battery (1).

[0004]

[Problem(s) to be Solved by the Invention]However, there was a problem which should be solved in the above-mentioned conventional charge monitor method and charging and discharging device of a passage. Usually, the relation between the charge of a storage battery

(1) and terminal voltage is nonlinear, and it depends for it on temperature. For example, terminal voltage will become small, if the terminal voltage of a storage battery (1) will become small if discharge current, i.e., load current, becomes large and temperature becomes low, even if a storage battery (1) discharges the same charge quantity. For this reason, it was difficult to grasp the charge of a storage battery (1) correctly and to supervise a charging state in the measured value of the terminal voltage of a storage battery (1), and it also difficult to perform charge and discharge control of a storage battery (1) with sufficient accuracy according to that measured value.

[0005]The invention of this application is made in view of the situation as above, The problem of conventional technology is canceled and it is making into the technical problem to provide the new charge monitor method which can grasp and supervise the charge of a storage battery simply and correctly, and the new charging and discharging device which can carry out the automatic control of the charge and discharge of a storage battery simply and correctly.

[0006]

[Means for Solving the Problem]An invention of this application provides a charge monitor method (claim 1) supervising a charge of a storage battery by measuring terminal voltage of an electric double layer capacitor by which the series connection was carried out to a storage battery as what solves the above-mentioned technical problem.

[0007]An invention of this application has the electric double layer capacitor by which the series connection was carried out to a storage battery, In [also provide a charging and discharging device wherein charge and discharge of a storage battery are made controllable according to terminal voltage of this electric double layer capacitor, and] this charging and discharging device, It provides as the mode that charge to a storage battery is suspended when terminal voltage of an electric double layer capacitor is beyond a predetermined value, and discharge from a storage battery is suspended when it is below a predetermined value (claim 3).

[0008]

[Embodiment of the Invention]The invention of this application carries out the series connection of the electric double layer capacitor (it is also called an electric double layer capacitor) to a storage battery, and is characterized [big] by the surveillance of the charge of a storage battery, and performing charge and discharge control of a storage battery further using the terminal voltage of this electric double layer capacitor. That is, what is called a hybrid system that consists of the usual storage battery and an electric double layer capacitor which carried out the series connection to it is constituted, and it is that of realization bundle ***** about the exact charge surveillance and charge and discharge control of a storage battery.

[0009]Here, an electric double layer capacitor is used as a capacitor which carries out a series connection to a storage battery because an electric double layer capacitor can store electricity

an electric charge equivalent to the charge quantity accumulated in a storage battery. By this, since the relation of $Q = \text{value flow coefficient (amount [of Q:passage electrical machinery] [q] C:capacitor capacity [F], V: capacitor voltage [V])}$ is materialized between a storage battery and an electric double layer capacitor, With the measured value of the terminal voltage of an electric double layer capacitor, the charge of a storage battery, i.e., the charged charge quantity, can be grasped correctly, and it can be supervised now. And if it switches according to the amplitude-measurement value, the automatic control of the charge and discharge of a storage battery can be carried out correctly, and exact prevention from overcharge and overdischarge prevention can be realized.

[0010]Drawing 1 is the circuitry which showed an example of such this embodiment of the invention. In the example shown in this drawing 1, the series connection of the electric double layer capacitor (2) is carried out to the storage battery (1), and terminal voltage is measured by the voltmeter V by which multiple connection was carried out to the electric double layer capacitor (2). And according to the measured value, the automatic control of the opening and closing of the switches SW1 and SW2 is carried out by the controlling circuit part CB. At this time, for example, when measured value is beyond a predetermined value, switch SW1 is opened wide, the charge to a storage battery (1) from a power supply is suspended, when [that] it is below a predetermined value conversely, switch SW2 is opened wide, and control that the discharge to load from a storage battery (1) is suspended is performed. Thereby, overcharge and overdischarge are prevented.

[0011]Although the invention of this application has the feature as above, it shows an example over the attached drawing below, and explains the mode of implementation of this invention to it in more detail.

[0012]

[Example][Example 1] Drawing 2 shows one example of this invention at the time of applying to a solar energy power generation system. In the example shown in this drawing 2, the solar cell (3) serves as charging power to the storage battery (1). Other composition is the same as the circuitry illustrated to above-mentioned drawing 1. In this case, if the voltmeter V is set as about 1V for example, while being able to store the electric power from a solar cell (1) in a storage battery (1) effectively, boost charge can be eased and reinforcement of a storage battery (1) can also be attained.

[0013][Example 2] Drawing 3 shows one example of this invention at the time of applying to the accumulating electricity device for load leveling. In the example shown in this drawing 3, the load leveling means (4) which functions as a converter at the time of the charge which switch SW3 closed, and functions as an inverter at the time of the discharge which switch SW3 opened is connected between power supply terminals. In this case, since the voltage of a storage battery (1) is generally high enough compared with the voltage of an electric double

layer capacitor (2), an electric double layer capacitor with high voltage (2) can be used, for example.

[0014][Example 3] Drawing 4 is the figure which illustrated the charging characteristic of the storage battery in this invention, and the electric double layer capacitor. The measured value of the terminal voltage of an electric double layer capacitor is proportional to the measured value of the terminal voltage of a storage battery, and is understood that the surveillance of a very exact charging state is possible so that clearly from this drawing 4.

[0015]Of course, this invention is not limited to the above example and various modes are possible for it about details.

[0016]

[Effect of the Invention]By the invention of this application, the charge of a storage battery can be grasped and supervised simply and correctly, and the automatic control of the charge and discharge of a storage battery can be carried out simply and correctly as explained in detail above.

[Translation done.]